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Journal of the Society of Arts.

FRIDAY, MAY 29, 1868.

Announcements by the Council.

CONVERSAZIONE.

The Council have arranged for a *conversazione*, at the South Kensington Museum, on Wednesday next, the 3rd June, cards for which have been issued.

ANNUAL CONFERENCE.

The Seventeenth Annual Conference between the Council and the Representatives of the Institutions in Union and Local Boards will be held on Friday, the 19th June, at Twelve o'clock, noon.

Secretaries of Institutions and Local Boards are requested to send, as soon as possible, the names of the Representatives appointed to attend the Conference, and early notice should be given of any subjects which Institutions or Local Boards may desire their Representatives to introduce to the notice of the Conference.

Secretaries of Institutions are requested to forward *at once* by book post, copies of the last Annual Reports of their Institutions.

ALBERT MEDAL.

The Council have this year awarded the Albert Gold Medal to Joseph Whitworth, "for the invention and manufacture of instruments of measurement and uniform standards by which the production of machinery has been brought to a degree of perfection hitherto unapproached, to the great advancement of Arts, Manufactures, and Commerce."

This medal was instituted to reward "distinguished merit in Promoting Arts, Manufactures, or Commerce," and has been awarded in previous years, as follows:—

In 1864, to Sir Rowland Hill, K.C.B., "for his great services to Arts, Manufactures, and Commerce, in the creation of the penny postage, and for his other reforms in the postal system of this country, the benefits of which have, however, not been confined to this country, but have extended over the civilised world."

In 1865, to His Imperial Majesty the Emperor of the French, "for distinguished merit in promoting, in many ways, by his personal exertions, the international progress of Arts, Manufactures, and Commerce, the proofs of which are afforded by his judicious patronage of Art, his enlightened

commercial policy, and especially by the abolition of passports in favour of British subjects."

In 1866, to Professor Faraday, D.C.L., F.R.S., for "discoveries in electricity, magnetism, and chemistry, which, in their relation to the industries of the world, have so largely promoted Arts, Manufactures, and Commerce."

In 1867, to Mr. W. Fothergill Cooke and Professor Charles Wheatstone, F.R.S., in recognition of their joint labours in establishing the first Electric Telegraph.

HARVESTING OF CORN IN WET WEATHER.

The Council having offered the Gold Medal of the Society, and a Prize of Fifty Guineas, for the best Essay on the Harvesting of Corn in Wet Seasons, received twenty essays, and requested the following gentlemen to act as judges:—Mr. J. Chalmers Morton, Mr. Clare Sewell Read, M.P., and Mr. Chandos Wren Hoskyns. These gentlemen have unanimously recommended the Council to award the prize to Mr. W. A. Gibbs, of Gillwell-park, Essex, and this award has accordingly been made.

The Council, in offering the prize, suggested that the first part of the essay—after noticing the various systems at present adopted in damp climates for counteracting the effects of moisture upon cut corn in the field, and for avoiding such exposure in wet seasons by peculiar harvesting processes—should furnish a practical and analytical exposition of the best available means:—

- 1st. Whereby cut corn may be protected from rain in the field.
- 2nd. Whereby standing corn may, in wet seasons, be cut and carried, for drying by artificial process.
- 3rd. Whereby corn so harvested may be dried by means of ventilation, hot air, or other methods; with suggestions for the storage both in the ear and after threshing.
- 4th. Whereby corn, sprouted, or otherwise injured by wet, may be best treated for grinding or feeding purposes.

The whole to be supplemented by a statement of practical results, and actual cost of each system described, and authenticated estimates of any process proposed for adoption, based on existing but incomplete experiments.

The above requisitions were given suggestively; not to bind the writer to the order or to limit the treatment of the subject, provided the essay was kept within the scope of practical experience and utility.

SUBSCRIPTIONS.

The Lady-day subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

FOOD COMMITTEE.

The Committee met on Wednesday, May 13. Present—B. Shaw, Esq. (in the chair); Mr. Harry Chester, Captain Grant, and Mr. J. Ware.

J. LLOYD, Esq., jun., Huntington-court, Hereford, Member of the Society of Arts, attended to give information as to the causes which retard the improvement of our salmon fisheries.

Mr. LLOYD—I am a magistrate, residing near Hereford, and a conservator of the rivers Wye and Usk, and have been engaged in salmon preservation for fourteen years. I have had considerable experience in the management of rivers, and shall be happy to impart to the Committee all the information I can. In the first place I would say it must be a subject of congratulation to us all that we live in a country where salmon exist in our rivers, as there are but few countries in the world where this noble fish is to be found. Owing, however, to causes which are pretty well known, it was found in 1860, when this subject was inquired into by a Royal Commission, that while Ireland and Scotland still retained an abundant supply, England was rapidly losing hers. That Commission was appointed for the express purpose of making inquiries “with the view of increasing the supply of a valuable article of food for the benefit of the public,” and in their published report the causes of this diminution were enumerated. Many of these still exist, and my object will be to point out to you what is still required to be done, and what the legislation on the subject in 1861 and 1865 has failed hitherto to effect. It may be interesting in the first place to state what is the relative production of salmon in England, Ireland, and Scotland. In Ireland there are 22,947 square miles of what may be termed salmon-producing ground, that is the drainage area of salmon rivers, and they produce an annual supply to the value of £330,000. England and Wales together have a like area of 55,080 square miles, from which must be deducted, as unproductive, 20,350, leaving 34,730 square miles which should be productive, according to the same calculation, of salmon to the amount of half a million annually. I should say that this calculation has been made very carefully by Mr. Ashworth, and is, I believe, correct. If Ireland produces £330,000 worth of salmon, England, with an excess of 11,000 square miles, ought to produce £500,000; but what is the fact? The calculation made in 1860 was that it produced £40,000. I believe there has been an increase since that time, but the total annual yield cannot be more than £60,000 at present. Yet one river in Scotland, the Tay, with a catchment basin of only 2,200 square miles, produces salmon to the amount of £30,000 a year. We are gradually, I hope, experiencing the effects of wise laws upon this subject. Every pollution abated, and every weir made passable increases the available area of breeding-grounds, and so directly produces an increase of fish,—but there still remains much to be done. According to the returns which have been obtained from Billingsgate market, there were, in 1861, 442 boxes of English salmon sold there, while in 1867 the number had increased to 2,405 boxes, being an increase of nearly 2,000 boxes, and that increase was gradually progressive from 1861 to 1867. This is very gratifying. My remarks will be chiefly confined to the three rivers of which I have had most experience, the Severn, Wye and Usk; and I have brought two maps, the one a large ordnance map, and the other designed by myself, whereon the district belonging to each river is distinctively coloured. These rivers, as you know, all fall into the Bristol Channel, and, together, have an area of 6,742 square miles. There are three principal causes which are retarding, and which will retard, unless they are remedied, the improvement of our salmon

fisheries:—1. Pollution; if the water is destroyed, there is an end to all increase of fish. 2. Weirs generally, especially mill weirs. This is a very serious matter indeed, as I will point out. In some instances they are used in catching nearly all the fish, while in others they block up the river or its tributaries, so as to prevent the salmon having access to the breeding grounds. 3. The discontent of the upper proprietors, which, I believe, one of the members of your Committee knows something about. When the nets catch too large a proportion of the fish the proprietors who hold the upper parts of the river are not so willing to render active assistance in preserving the salmon.

The CHAIRMAN—That would be connected with the second cause, would it not?

Mr. LLOYD—Not altogether. The second cause refers chiefly to the prevention of the salmon going up the rivers to breed; the third, to the upper proprietors' not unnatural discontent at the fish which have been bred in their waters being nearly all caught in the nets in the lower part of the river. 1. The pollutions.—There are pollutions of two kinds which injure our rivers very much. Liquid pollutions perhaps you are aware of, but solid pollutions also do much injury; they consist of scoria from iron works, slag, cinders, small coal, and refuse of that kind. Here are two of my maps, one showing the three districts I have mentioned, and another presenting a very different appearance, only that portion which remains good and productive being left white, and that is very little. What is coloured black shows the portion which is polluted, and the red that which is shut off by cause No. 2—the mill weirs. Both those large areas might be made good and productive. The main lines of the Severn, Wye, and Usk are productive of salmon; some of these little tributaries along their course are not, but where they are not shut off I have left them uncoloured. Taking first the liquid pollutions, the one which does the most harm, and which is of very serious moment in South Wales, is the vitriol used in the tin-plate manufacture.

The CHAIRMAN—Are the solid matters deleterious in themselves, or are they only destructive?

Mr. LLOYD—I will allude to them presently. The great South Wales coal basin comes in at the edge of the Usk district, and there are about 112 tin-plate mills in the neighbourhood. Indeed, South Wales is the seat of the tin-plate trade, there being only two or three other places where it is carried on; while there are 112 tin-plate mills in South Wales and the adjacent district, there are only seven in Staffordshire, one in Cumberland, and one in Scotland. The value of the tin-plates made in South Wales is said to be £2,000,000 annually. In the process of making these tin-plates vitriol is used in order to prepare the iron for receiving the coating of tin, and this vitriol, when it becomes surcharged with the oxide of iron, is rendered useless for acting upon the tin-plates, and is thrown as waste into the river. A process, however, has been discovered by which this waste vitriol, or “black pickle,” as it is called, instead of its being run into the river, where it discolours the water and kills every fish, can be utilised. Simply by boiling it in a particular manner, one-third is rendered fit for use again in the tin-plate manufacture, as pure vitriol, and the other two-thirds are converted into sulphate of iron or copperas, which is a marketable article. The process is patented, and is called Pughley's process, I think [producing specimens of the “black pickle,” and of copperas]. There is nothing to prevent its being generally adopted, as the charge made for using it is very slight. Several works have already adopted it. The calculation made is that £33,000 worth of vitriol is used in this district in the course of the year, of which, if this process were generally adopted, the whole, less one-fourth (the cost of conversion) might be saved, and at the same time the rivers made pure as they were before. Where it has been introduced salmon have been seen under the water-wheels of the very mills

where the poison formerly came from. I hardly know of any other instance where such plain and easy steps may be taken to remedy a great evil.

The CHAIRMAN—What steps can you suggest in order to make this process general?

Mr. LLOYD—I would make it compulsory. I would not allow the vitriol to be thrown into the water. I know it is to the manufacturers' own interest to adopt this process, and I think they ought to be made to do so.

The CHAIRMAN—Why do you not apply for an injunction to prevent the waters being polluted?

Mr. LLOYD—No doubt that is one course which might be adopted, but law is very expensive, and we, as a board of conservators, are very timid even in dealing with a miller. Here there are very large interests involved, and if the owner of the works says to his neighbours, "I do not want to go to the expense of this process, and if they persist I will stop my works," then it is a serious thing to the whole population. There are manufactories upon the Avon-Ilwyd brook, whose refuse would entirely destroy the river Usk, only that fortunately it comes in just at the tide-way, and is carried off. I and my brother conservators have been to some of these proprietors over and over again, and now we shall have to prosecute one of them.

Mr. CHESTER—I can see there might be a difficulty in commencing legal proceedings against an influential man employing a large number of workpeople, but suppose the Court of Quarter Session, under which you hold your appointment, were to direct you or some other officer to make a communication to the owners of these works, pointing out that if this process were used it would really be an advantage to them as well as the public, do not you think that would expedite matters?

Mr. LLOYD—If we had a little more power given us by the Act, we should be able to do so. I will show you presently where, in my opinion, the deficiency lies. I will now allude to one or two other sources of liquid pollution. In some parts we suffer from refuse from paper-mills. I am not prepared to say whether this can be utilised in any other form than as manure. It contains a great deal of chloride of lime, and, if it were run out into catchpools, would form valuable manure. A paper-manufacturer at Llangrwyney, on the Usk, told me this himself. The important point to be observed is to keep the refuse from the manufacture separate from the large bulk of water flowing from the water-wheel. Pollutions, however poisonous they may be, are easily dealt with, if the bulk is small. Then, at the head of the Severn there is a serious source of pollution in the lead mines, on the Clywedog and the Ceryst brooks. The Ystwith and the Rheidol are entirely destroyed from this cause; and in the Dovey, which also flows into Cardigan Bay, and in the Tees, the quantity of refuse from the lead-mines is very great, and does an immense amount of injury to the fish. I am afraid there is no process of utilising this, at least I am not aware of any at present. The only way of remedying the evil, therefore, is to have catchpools one below the other, so as to filter the water coming from the lead-mines until it passes away pure. That, I believe, is quite feasible, and unless something is done on many of our rivers they will be destroyed as salmon streams in a very short time, just as the Ystwith and the Rheidol have been. I went to see the Tees, and found the water quite thick and dark-coloured, and a man told me that the day before it was white like milk. We suffered much formerly in some parts from gas refuse, a good deal of the substance known in London as "Blue Billy" being found floating on the water. There is not so much annoyance from this cause now, as it is found that the tar can be utilised in at least half-a-dozen ways, and is even used in making fresh gas. There has been a great improvement in many of these things which formerly caused serious injury. The very noxious property in all these pollutions which destroy our fish, is that which should be saved and utilised; its destructive powers prove its value, and from every point

of view it would be a direct national gain, if manufacturers were compelled to utilise their waste and refuse. Sewage we have not found injurious to the fish, except in very large quantities indeed. It is very injurious to health, and I should certainly recommend that in all future powers given to Boards of Health the condition should be annexed, that they prevent the flow of sewage into rivers.

The CHAIRMAN—That is virtually decided.

Mr. LLOYD—I am very glad to hear that. It is very important that these things should be properly done at first, and at Abergavenny a very simple and inexpensive process has been adopted. In the city of Hereford they have spent a great deal of money to make a sewer into the Wye, and if they have to alter the system now, the alteration will cost double as much as if it had been done at first. The sewer was made in 1858. I will now bring before you some of the solid pollutions I have mentioned [producing specimens of slag, scoria, &c.]. This iron slag is very injurious indeed to the spawning grounds; it is not, of course, soluble in water. At one works they tip in nearly 10,000 tons of rubbish a year into the river; they tip it in as regularly as if it were on to a spoil heap; this comes down the river on the first flood, and covers over the spawning beds; the salmon, instead of turning up nice pebbles and gravel, turn up this sort of stuff, which certainly is not the natural material. I do not think Mr. Buckland would like to use it to hatch salmon on.

Mr. BUCKLAND—Certainly not.

Mr. LLOYD—It has become so bad on the Usk, that the Newport Harbour Commissioners sent Captain Alridge to report on the matter, and I will read a short extract from the report:—"I have to notice the accumulation of stones, scoria, and other matter below the powder-house point and at the entrance of the river Ebbw, which must come down from above on the ebb tide. I have taken up several of these apparent stones, and on handling them, been surprised at their lightness, until, on a closer examination, I have found them to be scoria or cinders, rounded and smoothed through the action of the water, and continual rolling downwards on the ebb until met by the flood tide, when they become deposited and accumulate, from the fact that they will not roll up hill again. This is a great evil and injury to the river, and powers should be obtained, if possible, to prevent it. I produce one specimen, picked up from under water, where my boat touched the ground, of what the rest is like. The river becomes almost ponded or barred (upwards) from just below the powder house point, and where there is a slight fall at low water." He then suggests that an examination should be made every year of the harbour with respect to this matter, as it affected the whole river from beginning to end. Then, again, there are large quantities of small coal in addition to slag thrown into the river. 40 miles up the Usk, at a place called Clydach, there are some iron works, and 30 miles below that, a blacksmith digs up small coal to burn in his smithy from the sand at the river side. The main bulk is however washed out to sea. I will now give you shortly my suggestions. In any amendment in the act of Parliament, I would suggest that all these offences, such as turning pollutions into a river, should be dealt with in a summary way before the magistrates, and that there should not be the power of carrying it to a higher court, where the expense of the improved process is alleged to exceed £100. That stops us in many cases, and prevents our taking action.

The CHAIRMAN—Do you not think the course of legislation is always to get the law settled by decisions of the higher courts, and then the inferior courts will follow those decisions?

Mr. LLOYD—That is not exactly the point. I do not wish to remove the right of appeal, but at present the Act says if the estimated cost of the preventive process shall exceed £100, then the case may be taken, almost

in the first instance, to a superior court. Another difficulty in our way is that we have to prove that fish have been actually poisoned; I think it should be sufficient to show that the substance is of a poisonous character.

The CHAIRMAN—Have you looked at the Nuisances Removal Acts, to see if they will assist you; there are two or three Acts?

Mr. LLOYD—We are pretty sharp on our board, and there are one or two good solicitors amongst us, but it has never been suggested that these Acts would assist us.

Mr. FOSTER—Would not the Commission on Rivers Pollution listen to you? There is a new Commission just appointed.

Mr. LLOYD—I have no doubt they will when they come to our district. To go on with my suggestions, I think a complete stop ought to be put to the tipping of rubbish into the rivers; that is a clear and gross case of injury. As regards boards of health, I think they should utilise the sewage; and I would advise all conservators to attend to these nuisances when they first appear, and when the remedy is much more easily applied. It would be a good thing if landlords would have clauses inserted in their leases, restraining their tenants from turning pollutions into the rivers. The Duke of Northumberland and Lord Tredegar invariably do this on their properties, and very great advantage has resulted. Connected with this subject is the abstraction of water by canals. The Usk is a river which I have been connected with from my birth. There is a canal there, the trade on which has dwindled away almost to nothing, and yet they take as much, and probably more water from the Usk now than they did when the trade was in full vigour, when, in fact, they were the carrying company for the whole district. They take eighteen millions of gallons a day, which in summer time absorbs nearly the whole of the river. They have no reservoirs or anything to equalise the supply. Their powers are to make and maintain a navigable canal; but what do they do with the water? They part with it to docks, and sell it to iron works, railway companies, saw-mills, and so on, and derive a revenue from water, which, I maintain, is misappropriated. Sometimes the river is dry, and of course where there is little water there can be few fish. This evil is of great magnitude in some districts, and I think it is really worth the attention of the Legislature. There might be a return moved for of what water is actually taken from rivers by canal companies, and whether they really make a proper use of this water.

Mr. CHESTER—Can you tell us what the state of the law is about this? Can anybody prosecute them for taking away the water?

Mr. LLOYD—The law seems to be that if the canal company has done any act colourably within their powers within 21 years, then it is legal. We have taken Mr. Manisty's opinion upon it; if once they take the water into their canal it is not our business to inquire what they do with the water.

Mr. JENKINS—I believe there was a case in point where the Swansea Canal Company were taking away the water from a mill, and nothing could be done to stop it.

Mr. LLOYD—The evil is one of great magnitude, for it prevents the fish ascending the rivers. That is the difficulty we have to contend with in the Usk. The fish will not ascend beyond a certain point, because the river is constantly dwindling away. There is a point five or six miles below the weir which they will not pass except on high floods. This large abstraction of fresh water is the cause also of the river stagnating and becoming foul, and in other ways does serious injury to the property of riparian owners. I think something might be done on this head; and even if these water companies were restricted, as they should be, to taking a certain quantity of water only, and then applying that to legitimate uses without waste, they should be obliged also to make storage reservoirs for summer use. The drain now upon some rivers in dry weather is more than they can bear.

The mills in some cases take nearly the whole river. In one extreme case, I have seen the river dry for quite a mile between the weir and where the leat comes in; what fish there were there were like tench in a pond, not like salmon or trout in a river. The mills should always allow some water to pass, in order to keep the fish alive and the stream fresh. I come now to cause No. 2—the obstruction by weirs generally, and especially mill weirs; and in the particular rivers I am now alluding to this evil is even greater than that of the pollutions. Here you see a map, on which are coloured in red all those portions which are shut off by mill weirs. In the area of the Wye, of about 1,600 square miles, nearly all productive, 700 or 800 square miles are shut off by these mill weirs. A large portion of the area belonging to the river Severn is cut off in the same way, and on the Usk there is a large tract. I find on the Severn and its tributaries there are 73 weirs; on the Wye and its tributaries 50; and on the Usk and its tributaries 45. All these 168 weirs could be made passable for salmon for less than £5,000; and were this done, an extent of nearly 2,000 square miles of salmon breeding grounds would be made available, and an increased produce of salmon, to the money value of £20,000, would be annually derived. One tributary of the Severn, the Terne, a river 60 miles long, and draining a large district, is entirely cut off from the parent stream in this way. The Lug, 47 miles, and the Monnow, 36, are similarly cut off by high weirs from the Wye. In some districts the pollutions rank first as difficulties in the way of salmon culture, but in the rivers I have specially alluded to the mill weirs are the greater evil. I heard from Mr. George, the clerk of the Severn Board, the other day, and he says they are at a dead lock on the Severn, as to making passes in one of the navigation weirs at Diglis; the inspectors of fisheries will not certify the passes until they are made, and the Navigation Commissioners will not make them until they are guaranteed that they will succeed; and between the two there is a dead lock. Mr. Phillips, from the Ouse, in Yorkshire, writes me word that “proprietors are ceasing to attend our meetings, because as long as Linton and Borobridge weirs are unopened no salmon can ascend; they now take but little interest in the river.” Very little has been done successfully to open up such weirs as these since the passing of the Act 1861; and just as they have been the chief cause of the ruin of our English salmon fisheries, they are now paralyzing the efforts made to restore them to productiveness. To remedy this evil we want more power. We do not want to do away with all the weirs, but only to provide passes for the fish. There is a weir on the Dee which you may have seen correspondence in the *Times* about. I have not seen the weir myself, but I know from the description that it must be prejudicial, as it presents an obstacle to the fish going up at low water. It will be quite hopeless to make very much of that river while the weir is in its present condition. I may state what was done within my own knowledge in the case of a weir on the Usk, at a place called Trostre. This weir was very high, and was fitted with cruives. In 1846 there was a flood, which broke the weir down, and salmon were seen at Crickhowell, 30 miles up the river, where they were quite unknown before. The reason was plain; there was a breach in the weir, and the fish immediately took advantage of it. Some gentlemen in the neighbourhood joined together and became tenants of the weir; they took away the fishing cruives, lowered the weir and put passes in it, and from that day the Usk has become one of the finest salmon angling rivers in England. They still kept the mill going, but by opening that weir in 1846 they made the river what it now is. The fisheries from that point up, are worth from £20,000 to £30,000; they are principally angling waters, but the estuary fisheries are also improved. There is no speedier mode of improving the fisheries of a river, than by removing a weir which prevents the fish going up to breed. There are weirs of three different kinds and classes, which are

thus divided in the Act, 1861:—1. Fishing weirs, *i.e.*, weirs used solely for taking salmon. 2. Fishing mill-dams, *i.e.*, weirs made partly for fishing, and partly for milling purposes. 3. Weirs generally, *i.e.*, those used exclusively for milling, navigation, irrigation, and such like purposes, and not in any way for taking salmon. As regards No. 1 and 2, the fishing weirs and fishing mill-dams, I may say at once, that in my opinion there is only one alternative. I am not at all in favour of conferring arbitrary powers on the boards of conservators, but I would certainly give them compulsory powers to purchase these fishing weirs and fishing mill-dams, the same as are given by the drainage act to landed proprietors, at a fair valuation.

Mr. FOSTER—Out of what funds?

Mr. LLOYD—Out of our own funds, which are derived from licenses for fishing in the river. There is a model of the weir on the Usk, showing the passes through which the fish travel as easily as possible; at the same time, as we never can tell what contingencies may happen unless the weir is our own property, we have now arranged to purchase it for £700. We know the value of our river, and the money is almost provided; we are simply waiting for the assent of the Lord Chancellor, the estate being in Chancery, and the weir will be purchased. We then intend to pull the weir down, but there will be no loss to any one on that account, for the grist mill attached to it is only worth £20 a year, and the weir being 273 yards long, it costs more to repair it and the machinery of the mill than the mill brings in. I believe it is to the interest of the country that these fishing weirs and fishing mill dams should be purchased at a fair valuation, they are a continual grievance to the upper proprietors, who therefore will never work heartily with those at the lower part of the river, while these fishing weirs and fishing mill dams are allowed to catch the ascending fish. There is the Dinsdale fishing mill-dam on the Tees, which belongs to Mr. Surtees; I believe he is anxious to do what is best for the river, but he has been troubled a good deal about his weir, and he says "no one shall touch my weir." I think therefore there should be power given to the conservators to say to him and other owners similarly situated, "your weir stands in the way of the improvement of the river, and therefore we will purchase it from you at a fair valuation." The fishing weirs are kept up as stated solely for fishing purposes; the fishing mill-dams for both fishing and milling purposes; in the latter case it might not be necessary at all to pull down the mills or throw them out of use, but by getting them into our own hands, we should be able to provide for the passage of the fish. In some cases, perhaps we might let the mill for £5 a year less, but it would be a great point to be able to say to the millers "we are your masters." When they are our masters they will not give up half-an-inch of water. We should raise the necessary money by subscriptions and by the funds of the board. They represent the whole of the river, and have power to borrow money for any purpose of this kind, and they are quite solvent, and could borrow money if necessary.

Mr. FOSTER—The removal of these weirs would be useful, not only from a fishing point of view, but also as regards drainage, would it not?

Mr. LLOYD—Yes; in many cases weirs injure the land above very considerably. I know an instance on the Trent where there is more injury done to the owner of the mill in respect of land above, which also belongs to him, than he gets from the mill. In some cases, therefore, it would not much matter whether the mill weirs were pulled down or not; but in others, where they injure both the land and the fisheries generally of the river, it would be a manifest advantage to purchase them and take them down. Power might be obtained to purchase any weir at a valuation, if found necessary. I come now to the third class of weirs—mill-dams and weirs—used simply for milling, irrigation, navigation,

and other purposes; and in these cases I do not think we ought to be answerable for all damages to the weir and the milling power when we are making a proper provision for the fish to pass. At the present moment, as I understand, we are answerable for any damage which the miller may almost conceive possible, or may be able to prove by the evidence of his own men. (See sect. 23, Act 1861.) The weir is generally a very cranky concern, and we do not like to run all these risks which are sure to overtake us in the case of any obstinate miller. If, on the other hand, the weir is built firm and strong, the owner refuses permission to make an opening in it, and too often obliges us to make our pass on one side of the weir in an unsuitable place. We yield to this through fear of damages, and consequently expend our money on a useless pass. We want to be able to say to the owner of the river, "You must let the salmon pass over the weir; that is a *sine qua non*, and as this must be done, let us put our heads together and see how it can be done with the least injury to you. There must be no claims for compensation." I think the miller would soon find a way of obviating all difficulty. It might be done, on small streams, by having a sluice open at the head of the pass at night and on Sundays when the mill is not at work, but at present all the water is ponded back to have more on the Monday, so that neither at night nor on Sunday does he give the fish a chance. On large rivers the pass could be always left open. Any interference, of course, is to a certain extent an injury, but when we consider how the interests of the whole country are concerned, we think the miller should give way a little; that he should be compelled to let us have the water at night and on Sundays, and in time of floods when he did not want it, and that there must be a pass made for the fish, which we would pay for. We must have greater powers.

Captain GRANT—It appears to me that one quarter of the width of the river should be left free for the fish to pass at all times. As for the Queen's gap, that is of no use at all.

The CHAIRMAN—What is the Queen's gap?

Captain GRANT—It is an opening made in the weirs, which the law requires to be left open so many hours in the week. It is monstrously unfair that the whole river should be shut off from the upper proprietors for six days a week.

The CHAIRMAN—Is this a provision in the English law?

Mr. LLOYD.—In the English, as in the Irish law, there is a provision for keeping open a "free gap" in fishing weirs, but not in fishing mill-dams and ordinary weirs.

Captain GRANT.—The upper proprietors on the Wye raise between £500 and £600 a year for the preservation of the fish, and they are the men who really do preserve the fish, and yet the large proportion is caught by the people at the estuaries.

Mr. LLOYD.—The lower proprietors contribute nearly two-thirds of that sum. But to continue—Many tributary streams are shut off as breeding ponds by these weirs, and I think we ought to have power to make passes for the fish without being liable to all sorts of claims for compensation. Upon some of these rivers, especially on the Ouse and the Severn, some of the weirs belong to the navigation commissioners, and they ought to be the first persons to do what is right and at their own expense—they are powerful enough and rich enough. The next point is, supposing you agree with the millers, or have sufficient powers given you to make these passes, how are you to make them? I cannot add much to what I said at the Salmon Fishery Congress last year. There are three plans known to us. The first is called "the open pass," the second, "the pool system;" the third, "the government ladder." The first, or open pass, is that which is adopted at the Trostre-weir, of which I have a model here [producing model and water colour drawings]. This weir is four feet in height, and the question has been raised whether the fish would ascend in this way if it were a six-foot weir. I should

not like to give a decided opinion either way, as we have had no means of trying. This is not a leap, and in darting up, the salmon never show themselves; it is a straight run through the weir. We made three openings in Trostre-weir, in order to give the salmon greater facilities than if there were only one, and there is still enough water retained to work the mill. The large run is three feet square and twenty feet long, and, being placed in the strongest lead of the river, suits the fish in the lowest water; the other two runs are smaller, and are placed nearer the upper corner of the weir, where in high floods the force of the current is not so great. A pass of this kind was tried at the Dimsdale-dam, which is 6 ft. 4 in. in height, and it has been pronounced a failure; but I do not consider it a fair experiment, as the pass was made at the side of the weir where the water comes with great force against the rock, so that there is really no approach for the fish. If the opening had been made in the centre, the fish would have had a fair chance. [Producing drawing.] I think the question is in this position, that Government ought to make a vote of money for making experiments in this direction, to see what the fish are really capable of doing. They often make a vote to try an experiment on a big gun, which certainly has not the effect of increasing the supply of food. I think they might spare something for an experiment in fish-passes, and perhaps, too, the Society of Arts might give us a little assistance.

MR. CHESTER—What would be the effect of a total abolition of all weirs?

MR. LLOYD—Steam power might be advantageously substituted in many instances; but to do away with all weirs would, I think, destroy a great deal of the commerce of the country.

MR. CHESTER—Could not that commerce be carried on in other ways? It seems at present that the interests of the millers are allowed to prevail over all others.

MR. LLOYD—At present they are masters of the situation. But we could not do away with the weirs altogether, because it is by damming back the water that they gain their water power. And this is not simply a question of corn mills; there are numbers of other mills worked by water power, so that we could not do away with them all. The second class of fish-passes is the "pool system," of which Mr. Buckland gives me the credit of being the inventor. The plan is very simple, as you will see by this model. It is not an open run, but you enable the fish to ascend the weir by making them leap successively from one pool to another, each raised slightly above the other, until they reach the top. This is quite in accordance with the natural habits of the salmon; and you are able in this way to gain height quicker than in any other. The first pass ever made on this plan was on the Cynrig brook, where it succeeded admirably. I have since made another on the Brân, which is equally a success [producing models, water-colour drawings, and engravings]. The model I have here represents a sloping weir, 6 ft. high by 22 ft. broad. The pools are here represented as being 8 ft. square. Each leap is only 18 inches in height. This plan is in practice now in several places besides those named, and I will guarantee it to succeed in every instance. In this model the leap at the top is made a few inches below the top of the weir; but here is another model in which the level of the weir is not touched at all. Side by side I would place a model of the Government ladder of 1 in 8, in which the fish have to pursue a zigzag course; I believe that form of pass is exploded now altogether. You will see here that it is of nearly twice the length of a pass on the pool system, and, while being far from as effective, is more difficult and expensive to construct. One was put up on the Conway, at a cost of £500, and another at Linton weir, on the Ouse, at a cost of £250, and I believe both are entire failures. They will only answer where the rise is not more than 1 in 7 or 8, and they are consequently very expensive to construct. I would suggest

that where they are found not to answer, the opening on alternate sides of the run through which the water passes should be closed, so as to form a succession of pools, and the bottom of each compartment deepened, and then the fish might leap from one to the other. In places where the face of the weir is perpendicular, a somewhat different plan must be adopted to those I have shown, the pass on the "pool system" being carried through the weir, and the apex being on the same level as the top of the weir, but necessarily further up the stream. It is fatal to the success of any pass to allow its foot to project out beyond the weir, and hence the difficulty in treating perpendicular weirs. Here is one more model of an entirely new design, though a modification of the pool system. I have copied the plan from nature, and I will guarantee its success whenever it is practicable to make it. You will observe the water passes through a succession of oval pools, which are connected one with the other by a short and narrow neck. By this plan the water is economised, and it comes down with a gliding motion from pool to pool, rather than with a precipitous fall. The third class of fish-passes is that of the Government ladder, originally invented by Mr. Smith, of Deanston. I believe they have in nearly every instance proved a failure, and I mention them here only to express my strong condemnation of them. They are very difficult and expensive to construct at anything like a proper gradient, and they neither afford a good lead of water nor straight course for the fish, which are both necessary. I come now to the last difficulty—the discontent of the upper proprietors. Referring to what Captain Grant has stated on this point, I should like to correct it, as he has rather overstated the case in asserting that there were only 30 fish taken in the Wye with the rod, above Hereford, last year. There were really about 500. There were 94 taken on Viscount Hill's water, at Bulth, and I know Mr. De Winton and others took a good many. I am positive that nearly 500 were taken.

Captain GRANT—Mr. Baskerville used to take 60, and last year he only took six.

MR. LLOYD—I know there is a good deal of foundation for this dissatisfaction, and for that reason I think there should be modifications in the weekly close time, which at present is 42 hours in all rivers. Where a river is only netted for a small part of its course that may do very well, but when you come to a river like the Wye, where there are 74 miles netted, and you consider that the fish have to pass the whole of that distance in 42 hours, in order to reach the upper parts of the river, it is plain that the object of the Act is not fulfilled. To meet cases of that kind there should be exceptional legislation. The upper proprietors are now in a very bad position, and by increasing the number of nets the lower men may almost entirely cut off the supplies. There were riots and very wild proceedings last winter on the upper part of the Wye; and I am afraid the gentlemen in the neighbourhood have not taken such active steps to put them down as they should—steps which they would doubtless take, but from a feeling that their own interests are not properly secured. I think, therefore, it would be good policy on the part of the lower men to give a little more to those on the upper part of the river, who could do so much to protect the spawning fish in the winter months. I would propose to meet the case of the Wye and other rivers similarly circumstanced, such as the Ribble (which is also netted for a great length), by having a varied weekly close time. In the Wye, say, I would divide the lower 74 miles of the river into two portions, one extending from the mouth up to Lydbrook, a distance of 34½ miles, and the other from Lydbrook to Hereford, a distance of 39½ miles. The weekly close time in the lower division would be from 6 a.m. Saturday to 6 a.m. Monday, and on the upper 6 p.m. Saturday to 6 p.m. Monday, so that the fish in ascending the river would find the nets disappear before them. There would be then in fact a close time of 60 hours, though none of the net

fishermen would lose more than 48 hours, including the Sunday. This arrangement certainly gives an additional six hours' close time, and I cannot think 42 hours is enough with such a length of river. It is 42 hours' work for a fish to get up to Ross, and if there is no more law for him he may be caught before he gets to Hereford, and he will have no chance to get up to Captain Grant's ground at all. I would, therefore, have 48 hours' close time, and the period later at the upper portion of the river than the lower; and by that means I think the fish would have an opportunity of ascending freely. We intend to introduce some such plan on the Wye as soon as we can get authority from the Home Office, and I should say that I think these matters of detail might be left to the Board of Conservators to determine for themselves. For instance, as regards the nets: on some rivers the trammel nets are considered very destructive, but on the Wye we like them. It is my own proposal to ask for six hours' additional, but the majority of our Board approve of the principle of a varied weekly close time at different parts of the river. There is one other little matter I should mention. I think it would be good policy if some fish were sent up from the estuaries where they are chiefly caught for sale in the different towns higher up the river. It would serve to make the fishery laws more popular in the inland districts; and a scheme has been started on the co-operative principle to effect this very object on the banks of the Usk. It is doubtless a matter for the persons locally interested to arrange, but the suggestion here may be of some service.

Captain GRANT—Do you not think it would rather complicate the matter to have different close times in different parts of the river?

Mr. LLOYD—I think not.

Captain GRANT—And more fish run by night than by day?

Mr. LLOYD—In the freshwater, but not in the tide-way. I do not think we can adopt a better method of giving the salmon a chance to ascend the river. In conclusion, I have to thank the committee for the attention they have given to my statement. I believe there is a vast field for improvement which is hardly yet touched, and that a very great amount of food can be produced from it. I look upon our rivers as large farms, which if well cultivated would yield large returns; and while we gain an increase in the fish sent to market from our net-fisheries, we can also improve our angling waters, and give more sport to the country gentlemen. Our rivers, however, possess this advantage over farms, that from the time the salmon is hatched until he is placed on the dinner-table, he costs us nothing in food. We simply require our rivers to be free from injurious pollutions and weirs, and to produce a cordial feeling between the upper and lower proprietors, whose interests are really identical. Wise legislation will effect this, and then, with the forbearance and encouragement of the public, we shall be able to give this great experiment of increasing the supply of national food a fair trial. I cannot doubt that the result will then be successful. It is a great point to get the public to understand the difficulties that now retard the improvement of our salmon fisheries, and to this end I trust the present discussion will be of some service. In common with all others interested in the culture of our rivers, I am most pleased to see that the Society of Arts have taken the subject up in the earnest manner they appear to have done.

Mr. F. BUCKLAND—If the Committee would allow me, I should like to add a few words to what has been said by Mr. Lloyd. First as to the pollution by lead mines. We have been very urgent upon Mr. Dymond, who lives upon the South Tyne, to make the catch pools which Mr. Lloyd recommends; he is now laying out several thousand pounds in doing it, and I hope Mr. Lloyd will go and see them. The arrangement is by Mr. Sopwith, the engineer, on the gravitation system, and I have no doubt it will answer admirably. If they

succeed we can then go to Parliament and demand that others shall do the same. I agree with what has been said as to throwing slag and refuse into the rivers; it is a most injurious and disgraceful practice. Town sewage is not pernicious to fish except in very large quantities, or unless it contains gas refuse, in which case, as happened at Llangollen, the fish will be killed. We shall be very glad if the Society of Arts will help to put down these pollutions, and say it shall not be done. Why should dirty water be allowed to flow into the rivers? Mr. Walpole and myself have been making a new act, and have submitted it to the Home-office lawyer, and we have made the clause about pollutions as stringent as we possibly can. We quite agree with Mr. Lloyd that it should be more peremptory.

Mr. JENKINS—In most of the acts under which gas companies are constituted there is a clause about the disposal of their refuse.

Mr. CHESTER—Would it be well for the Society of Arts to petition Parliament in favour of that Bill?

Mr. BUCKLAND—I wish they would. You are about the only people who support us in this matter, and we have a hard fight against the manufacturers. At Herne Bay the manager of the gas works has found that the strong liquor which comes from the retort, when diluted with water, makes a most valuable manure for grass land. As regards the abstraction of the water of rivers by canals, I may say that on the Dee there is a weir (or lock) which is built right across the river, and stops all the water, only about an inch flowing over the top. The whole water of the Dee, you may say, is turned down that canal; and little fish, which my friends the conservators have been at great trouble and expense to rear, are carried through the grating into the canal, and go nobody knows where. When they come back from the sea, if they were allowed to get there, they would be worth £1 a piece. They get down into the Shropshire Union canal, and some say they get out into the Severn, but it is very doubtful; very likely they get into the sewers of Chester or Liverpool. We went before the House of Lords, but they declined to hear us, on some technical point. Then as to the weirs, I quite agree with Mr. Lloyd that they are very detrimental, worse than pollutions, because these may be diluted by floods, but the weirs are what I call permanent sentries, always on duty. The conservators should have power to purchase these. If anybody wants to invest £1,700, let them buy that mill at Chester; they would immediately get the right over the weir, and could let the fish pass up to the upper waters, and in two years it would pay. I think great credit is due to Mr. Lloyd and his friends, for their good example in buying Trostre-weir; and I should much like to see the same thing done elsewhere, particularly at Dimsdale. As to the millers, they ought to be obliged to let the water pass at night and on Sundays. Mr. Chester's observation was quite correct; they are masters of the river. It is a question of bread *versus* fish, but there is no reason why we should not have both. The question of compulsory powers is one which Mr. Walpole and I have been considering with the Home-office lawyer, but it seems a very difficult one. We have done all we can in the matter. As to the question whether steam could not be made to supersede water power in these mills, I would recommend Mr. Ashworth's little book to the consideration of the committee; he shows that in many cases it would pay well to pull down the weirs and use steam for the mills. Mr. Lloyd made a very valuable suggestion as to the granting of money for the purpose of making experiments on fish ladders. The pass on the pool system at Cynrig Weir is the first I ever saw made on that plan; it succeeds admirably, and Mr. Lloyd is entitled to much credit for having designed a fish-pass at once so simple and efficient. There is one on the pool system also at Llangollen, and the local fishermen say they can now get no fish, which shows its efficiency. If we could get

a small grant from Government for the purpose of making these experiments—we do not ask for thousands—it would do a deal of good, or, perhaps, the Society of Arts might assist us.

Mr. CHESTER—What do you mean by a small grant?

Mr. BUCKLAND—£200, or even £150. We are now in a state of doubt as to the Dimsdale pass Mr. Lloyd has mentioned. If we had from Government, or the Society of Arts, a grant of £100 we could solve that question, and having solved it, it would be a precedent for all Boards of Conservators to act upon hereafter.

Mr. CHESTER—The Society of Arts always like to call out local exertion; do you think, if we offered to contribute so much, and the Government so much, the Board of Conservators would add something to it?

Mr. LLOYD—I am not connected with that Board, but I feel confident they would.

Mr. BUCKLAND—Mr. Lloyd's models do him a great deal of credit, and he has promised to lend them to me for my museum at South Kensington; I hope the fact will be announced. My man will be there to explain them, if I am not. As regards the bye-laws which Mr. Lloyd has proposed, I am convinced, after seeing a great many rivers, that no two are alike, and that, therefore, universal legislation will never act well. I therefore agree that the Local Boards should have power to regulate the mesh of the nets, the weekly close-time, and matters of that kind, subject to the approval of the Home Secretary—in fact, to make bye-laws.

Proceedings of Institutions.

YORKSHIRE UNION OF MECHANICS' INSTITUTES.—The twenty-first Annual Meeting will be held in the city of York on June 3rd and 4th. The conference of Delegates will commence in the Institute of Popular Science and Literature, St. Saviour-gate, York, on Wednesday, June 3rd. Mr. E. Baines, M.P., President, in the chair. In addition to the transaction of the ordinary business, the following subjects will be discussed:—

1. The increased importance of primary education in order that our members may be prepared for receiving technical education.
2. How can Mechanics' Institutes be made available for technical education?
3. The propriety of commencing a Magazine under the direction of the Central Committee.
4. Female Education.
5. How to get the employers of labour to associate more with us in the working of our classes.

The Conference will adjourn, at 2 p.m., for half-an-hour, during which time refreshments will be provided by the committee in the Library of the Institute. The central and local committee invite the delegates to tea, in the Merchants' Hall, at 5 p.m. After tea the testimonial to Mr. James Hole will be presented by the president. His Grace the Archbishop of York will preside at the public meeting, the chair to be taken at 7.30 p.m. On Thursday morning the delegates will assemble at 10 a.m. A visit will be paid to York Minster, the Castle, the Museum of the Philosophical Society, the ruins of St. Mary's Abbey, and to several manufactories. A concert will be given in the afternoon by the inmates of the Wilberforce School for the Blind.

Fine Arts.

MOSCOW MUSEUM OF APPLIED ARTS.—The new Museum of the Fine Arts applied to Industry, established in the Strogonow School of Design of Moscow, was inaugurated last month. The general plan of the Museum was drawn up by M. Boutowsky, on the basis of a plan drawn up for the Lyons Chamber of Commerce by M. Natalis Rondeau, which has been very generally approved. The Museum is divided into three sections:—Fine Arts, Industry, and History; and it includes—Collections of Flowers and Plants remarkable for beauty of form or colour, collections of Animals,

Birds, and Insects; a cabinet of Drawings and Prints; a special Library of Illustrated Works relating to the Fine Arts; Decorations, Ornaments and Architecture; and an atelier and workshop for the use of the pupils of the school and of the public.

Manufactures.

PROPOSED EXHIBITIONS AT LYONS.—It is said that measures are being taken for the holding of industrial, artistic, and agricultural exhibitions at Lyons next year, to open in May, and close in August. The three exhibitions will be separate from each other; the first to be held on the new Cours Napoleon, the second in the Museum or Palais des Arts, and the third in the park of the Fête d'Or. A great festival of the orpheonists and of the musicians of the Rhone and the neighbouring departments, is proposed to be held at the same time.

MANUFACTURE OF PAPERHANGINGS IN ITALY.—At Turin there are two manufactories of paperhangings, the first employing 25 workmen, and the second 16; the products of both these manufactories are distinguished by the excellence of the work and the brilliancy of the colours, and at the same time by their cheapness. They produce annually about 50,000 kilos. of paperhangings, at prices varying from 60 centimes to 3 francs per metre. At Milan there are nine establishments, employing in all 60 workpeople and 48 children. The average wages are 1fr. 50c. per day for the adults, and 44c. the children. The colouring is done by hand, and the quantity of paper used yearly is 30,000 rolls of 7 metres each, and 200 reams of paper, called *leone*, for ceilings. There is also another manufacture at Fibreno, in the Neapolitan provinces, which produces excellent qualities of paperhangings, such as flock, gilt, marbled, and glazed, which can compete with foreign productions. The following are the imports of the best qualities of hangings to Italy, and the trade is almost exclusively with England and France:—

Plain coloured paper.

	Kilos.	Francs.
1863	209,100	657,000
1864	82,400	247,000
1865	10,800	151,000

Flock and other fancy sorts.

	Kilos.	Francs.
1863	132,200	327,000
1864	306,200	756,000
1865	408,700	1,009,000

Commerce.

MINERAL STATISTICS OF ITALY.—The following is the average annual produce of the mines and metal works in Italy at the present time:—

	MINES.		WORKS.	
	Quantities.	Amount.	Quantities.	Amount.
	kilos.	frs.	kilos.	frs.
Iron.....	143,499,300	2,053,330	57,004,900	16,444,000
Copper	32,010,100	1,551,692	1,012,200	2,793,706
Lead and Silver	16,047,700	2,935,285	{ 12,936,100	5,986,758
			6,026	1,409,235
Gold { ore	103,800	9,100	125	236,331
{ native ..	94	226,551		
Mercury	4,760,800	56,600	29,600	126,040
Zinc	282,800	10,000	80,000	36,000
Antimony	100,000	50,000	50,000	60,000
Nickel	7,000	1,043	37,600	131,631
Iron pyrites	4,750,000	25,900
Manganese	826,000	41,670
Coal and other fossil fuel	119,870,700	1,022,868	20,000,000	800,000
Sulphur	168,681,700	18,671,784	8,225,000	1,346,000
Boracic acid	1,805,500	1,445,890
Total		26,655,823		30,815,591

Colonies.

THE WHEAT CROP IN SOUTH AUSTRALIA.—The wheat statistics have now been collected of the greater part of the colony, and an estimate of 308,000 bushels allowed for the south-eastern district. The returns state that the average yield throughout the colony will not be above four bushels, or 42lbs. to the acre, against 14 bushels reaped last harvest. The cause of this great deficiency is the red rust which attacked the crops just before they were ripe. The total area under cultivation for wheat had increased nearly 100,000 acres against last year. The total yield this year is 2,605,972 bushels, and no less than 55,399 acres had not been reaped. The estimated quantity of flour for export during the year is from 20,000 to 30,000 tons.

THE FORESTS OF VICTORIA.—A board has been appointed to consider the best means of protecting and improving the state forests, and the report has been made. Under the Land Act of 1862, 8,567 acres were then set aside, with 24,000 more specially for a supply of timber. Under the Amending Act of 1865 the total reserve is 82,866 acres. There are only two forests of considerable extent included in the list, Bullarook, of 4,200, and Dandenong, of 2,500. But the board rightly recommends that from time to time particular tracts of country which may be found unsuitable for settlement shall be added and duly protected and planted. Near Melbourne all the good trees have long since been cut down, and the citizen unacquainted with the bush has no idea of the magnificent timber to be seen in the more secluded and moister mountain regions. Among the several important objects of these reserves is a permanent timber supply. There is an enormous consumption of wood in this colony. The report states that since the discovery of the gold-fields it has paid over eight and a half millions sterling for imported timber; and it is recommended that there be extensive plantations of pine, as the wood most in demand by the builder. On the gold-fields there is already great inconvenience as to the supply of wood suitable for underground drives. The adjacent woodlands being used up, the article has to be brought long distances. It has become a serious item of mining expenditure; and if by-and-by scarcer and dearer, the circumstances will seriously interfere with mining enterprise. State forests, if properly managed, will prevent this failure of supply.

PEARL SHELL FISHERY.—On the coast of Western Australia this fishery has been most prosperous, and a large number of boats are engaged in it. The returns average a ton of shells per 27 days for every white man employed; but, it must be observed, that much of this beach combing work, for it is little more, is done by natives, but even then the gain must be great, considering that a ton of shells will readily sell in the colony for £100, giving £25 a week for each white man engaged in the venture. Such good results cannot last long; and the simple means and small craft now so successful in the shallow waters along the coast will soon find they have gathered in all the harvest within their reach, and the field of deeper waters will require larger craft, fitted with proper diving apparatus, the employment of which will, in all probability, produce equal if not better results.

Notes.

PARIS EXHIBITION, 1867.—The following paragraph is quoted from the letter of the *Times* Paris correspondent, which appeared in that journal on Thursday, the 21st inst.:—"The dispute between M. Bernard, to whom was accorded the concession for placing chairs in the Universal Exhibition, on the one hand, and the Imperial Commission on the other, has only now received

a settlement. The former last year brought an action against the latter to obtain compensation for the loss which he pretended to have sustained by the proprietors of the restaurants in the outer gallery being permitted to place seats before their establishments. M. Bernard then estimated the prejudice done to him at 541,093fr.; the Commission contested that amount, showing, among other reasons, that the infringement complained of ceased on the 22nd of August. The Civil Court, in consequence, postponed its judgment, and appointed experts to calculate the damage. On the report of these latter, the judges have now condemned the Imperial Commission to pay plaintiff 229,071 fr., with interest and costs."

EXHIBITION OF INSECTS IN PARIS.—An exhibition of useful and destructive insects is announced to take place in the Palais de l'Industrie, under the patronage of the Minister of Agriculture, during the month of August. It will be remembered that an exhibition of the same kind, on a small scale, was held in the same building in the year 1865, through the efforts of the Central Society of Apiculture; that first attempt gave rise to the formation of a new society of agricultural insectology, and it is this latter association which is entrusted with the organisation of the coming exhibition. The committee includes Dr. Boisduval, M. H. Hamet, M. Guérin-Méneville, M. Focillon, and several other entomologists and scientific agriculturists. The exhibition is to be made as comprehensive as possible, the scheme including the propagation of useful insects, methods of curing or preventing disease, and economical management; and the illustration of destructive insects, with means for opposing their ravages. It is desired that each class should, if possible, be exhibited in all its transformations, from the egg to the perfect insect, together with the matters on which it feeds. Printed or written memoirs are also to be admitted, even without specimens of the insects to which they refer. As regards destructive insects, the society has determined on a practical instead of a scientific classification, the sub-divisions being formed by the plants upon which the creatures feed. Two additional divisions are added to the programme of the exhibition; one including carnivorous insects, and small mammiferous animals, such as the mole and hedgehog, which feed on insects; the other being devoted to the illustration of the ravages committed by snails and slugs. Some idea of what this amounts to in the vine-growing districts of France, may be formed from the fact that thousands of bushels of snails are collected in the vineyards and sent to various markets all over the country; during the summer months the supply of this popular article of food is large and continuous all over France. As upon the former occasions, conferences on various subjects connected with insectology, will take place in the exhibition. Foreigners are invited to take part in the coming exhibition, applications to be sent in before the 20th of July, to the secretary of the society, No. 1, Rue Cadette, Paris, or at the Palais de l'Industrie. The insects or other objects of exhibition are to be sent in before the 25th of July, and the exhibition opens on the 1st, and closes on the 31st of August. The following are the principal heads of classification:—First division—Useful insects:—1st class: Silk producing insects. These will form the most important feature of the exhibition; the malady of the *gattine*, which has existed amongst the silkworms ever since 1848, is estimated to have caused a loss amounting to more than 60,000,000 francs, or nearly 2½ millions sterling per annum; 2nd class: Insects producing honey and wax; 3rd class: Insects used in dyeing and for colour; 4th class: Edible insects, crustacea and mollusks; 5th class: Insects employed for medical use; 6th class: Insects used as ornaments. Second division—Destructive insects:—Ten classes, viz., those which attack cereals, the vine, plants used in industry, forage, vegetables and ornamental plants, fruit trees, forest trees, timber used for building, truffles and fungi, dry organic matters, and, lastly, para-

sites of man and domestic animals. The third division includes three classes—carnivorous insects, parasitic insects, destructive of chrysalides, and insectivorous animals, birds and reptiles. The fourth division includes—insects and other creatures destructive of mollusks; and notices respecting edible snails and the benefit that cultivators may derive from them. Lastly, optical instruments for entomological purposes, and special apparatus connected with the rearing or destruction of insects. Medals and honourable mentions will be awarded for the most remarkable objects exhibited.

EULOGIUM ON FARADAY, DELIVERED AT THE PARIS ACADEMY OF SCIENCES.—At the annual meeting of the French Academy of Sciences, of which Faraday was an Associate, a brilliant eulogium of the late philosopher was made by M. Dumas, recently appointed perpetual secretary in the place of the late M. Flourens. "On the labours of Faraday," said M. Dumas, "on his immortal discoveries, rests the doctrine of the eternity of the forces, and of their incessant transformation in the inexhaustible loom of time. Faraday did in the domain of modern physics what Goethe did in that of morphology. The name of Faraday, one of the purest of England's glories, will live in history, not only as the symbol of the genius of investigation, but of the true British self-made philosopher, formed in the rude school of poverty." M. Dumas declared that science had its poetry, and that even Dante, in his terrible *enfer*, could not conceive the idea of that carbonic snow, which burns like a red-hot iron, and changes mercury into a substance as solid as lead; he could not tell of those volatile liquids compared with which water seems like a syrup and alcohol like thick oil, with such facility do their atoms roll over each other. The orator terminated his brilliant eulogium by comparing Faraday with his peers—with Ampère, Ørstedt, Arago, Léon Foucault—pointing out the resemblances and the differences in the minds of these "creators of modern physical science, that science," said M. Dumas, "which will one day culminate in the production of its Newton!"—In the presentation of the various prizes of the Academy, a touching incident occurred:—M. Bour receiving a gold medal in honour of the analytical labours of his son, snatched from science at an early age.

Correspondence.

ENGLISH LABOUR.—SIR,—Since the discussion at the Hall of the Society of Arts, on the evening of the 20th instant, I have referred to some memoranda which I kept from January, 1864, to March, 1865, when I occupied a farm of 62 acres, in Devonshire, near Barnstaple. It appears that I paid 9s. a week for each out-door labourer, without extras, except for my bailiff, to whom I gave also coals, candles, and his rent. I paid extra during the hay-season and during harvest. I paid for my female labour at the rate of 9d. a day. Upon an average, during the said 15 months, wheat sold at 5s. 6d. a bushel when these wages were paid. I allowed the out-door labourers a quart of cider each daily (except Sunday) all the year round, or the weekly wages would have been 10s., not 9s., as to males, and 5s. 6d. instead of 4s. 6d. for females. They worked well from 7:30 a.m. to 6:0 p.m., daily, deducting an hour for dinner and rest. The year 1864, in Devon, was a good cider year, and I sold mine at the press for 10s. per hogshhead, readily. This cider, although much consumed in hot weather, quite agrees with the natives. It is strong and hard, having undergone vinous fermentation, but its acidity causes occasional flatulency and colic to strangers. The sweet cider is exported—the usual fermentation having been checked, but it is less nutritious and potent than the fermented cider. It appears, from the "Chronicles of the Canon-gate," vol. iii., p. 3, that cider was known in Scotland in the 14th or 15th century. Orchards are not mentioned in Domesday Survey, nor in later records;

but orchards and cider fruit are mentioned in Hooker's MS. "Survey of Devon" in the 16th century, and in the 17th century in "Risdon's Survey" of Devon. Sometimes the cider is boiled, whereby two hogshheads are reduced to one, which plan increases the strength and improves the taste of the cider. See further, in "Mac Culloch on Wines." The Americans are now making a light wine, called "Vin de pomme," from apples.—I am, &c., CHAS. COOKE, Member of the Society of Arts.

London, May, 23, 1868.

THE AGRICULTURAL LABOURER.—SIR,—Giving way to a stranger, who simultaneously rose, and then from the length of the discussion I did not make the few observations I intended, and consequently will trespass on your columns, and that as shortly as possible. Having taken some pains to obtain and reduce to a tabular form the wages and perquisites of at least nine counties, I find their average so approximates those of Mr. Bailey Denton as to preclude the necessity of an especial place; but as the letter of one of my correspondents in Norfolk* is eminently interesting, I extract a portion of it. He says:—"I am sure any person who has known this county for the last 20 years must willingly testify to the fact that a great improvement in the moral and social condition of the labourer has taken place within that period, and is still going on; the causes which have led to this desirable result are improved cottages—the allotment system—the abolition of mixed gangs, and the practice, now becoming general, of keeping the children at school, boys until 12, girls to 13 or 14 years of age. The greater part of the land in the county of Norfolk is in the hands of large landowners, who, almost without exception, have in the matter of cottage improvement nobly done their duty. I know of several estates where considerable sums have been annually devoted to the building of new and the remodelling of old cottages; all the new cottages have two good rooms and pantry on ground floor, three bed rooms on the chamber floor, with detached shed and convenience to each; in many cases two of the old cottages have been made into one. The alteration in the law of settlement and rating from parish to union rating will lead to cottages being erected where they are most wanted, viz., contiguous to the farm on which the labourer is employed. The allotment or spade farm is, under proper supervision, a substantial benefit to the working man. In this and adjoining parishes nearly every respectable married labourer has half an acre of good land for a yearly payment of 12s. (12s. including rent, rates, and all other charges). The rents are punctually paid, arrears being unknown; and when one of them becomes vacant the applications for it are numerous. The large companies of young children of either sex working together under the odious name of gangs, were pretty generally broken up and abolished long before legislation on the subject was thought of, owing to the grievous immorality consequent on the system. Gangs are now only to be found in the fens, and on a few damp farms in West Norfolk; the work for which gangs used to be employed, such as picking couch, weeding corn, cleaning root crops, &c., is now done as efficiently (although it may be more expensively) by women and girls, who prefer outdoor work and liberty to the comforts and restraints of domestic service. A good deal of summer weeding is now done by men—a few boys, as young as ten, are employed for a few weeks at bird-keeping, spending the rest of the year at school—but as a rule no children of a less age than 12 to 14 are put to any sort of hard work, at least, I have never met with instances to the contrary, except on paper. Cottage rents are 1s. to 1s. 6d. per week, usually with good garden. The harvesting is generally done in this way:—A company of men are hired to cut (with scythe or machine), carry, stack, and thatch all the corn; on land producing bulky crops, one man for every 12 acres; on light land one to every 15 acres, is the calculation; rate of wages of

* The steward of Lord Sondes, Elmham-hall.

late years £6 to £7 for the harvest, with assistance of women, old men, and lads to bind the wheat, gather barley, etc., given in; the harvest in nine years out of ten, begun and finished in 18 working days; cost per acre, 12s. to 18s. The plan has this great advantage, that the interest of the employer and servant are identical—the farmer seeing that his crops are not too hastily carted.” I quite agree with Mr. Bailey Denton that the improved execution of work will be the cause of advanced wages, and from experience am of opinion that the condition of the agricultural labourer is chiefly to be improved as follows:—1st, By practical education, producing prudent forethought and economy on his part; 2nd, By piece work where possible instead of day work, the utmost employment being given by the farmer, who should be a man of skill, enterprise, and capital; 3rd, The tenant should require long leases, with very few restrictions, a sufficient number of substantial cottages for his labourers, with gardens attached to or near the same, large enough to grow sufficient vegetables required for his family. With respect to improvements made by the tenant, the long lease or compensation for all unexhausted improvements should be made. Drainage of strong, wet lands has worked wonders. I have been over a field of beans in September, one part drained the other not; the drained division was just as high again as the undrained; the crop was in the same proportion. I am of opinion that though 8 or 10 millions have already been expended in draining, probably ten times that amount might be spent profitably to the capitalist, landed proprietor, tenant, labourer, and general public, to say nothing of its immense sanitary importance. In conclusion, I will add that amongst the many subjects of interest brought under notice this session, few are of greater value than the one under review; it reminds me of an emphatic observation made to me 35 years since by the venerable and patriotic Earl of Radnor, which ran thus, “I consider the legislature is acting in its most legitimate capacity when legislating for those who cannot do so for themselves.”—I am, &c., Wm. BOTLY.

MUSHROOMS.—SIR,—A Norwegian landscape painter, a friend of mine, staying with some other friends of mine at Sorrento, on the Bay of Naples, many years ago, in his artistic wanderings in the neighbouring woods, found a very fine specimen of a fungus, which he recognised as similar to those which are eaten in his native country. It was an elaborate specimen, like a cauliflower, and he took it home to be cooked. There were some demurs on this point from the others of the party, but he assured them of its wholesomeness, only he must superintend the preparation. Under his supervision it was boiled in three waters, the two first being thrown away, and the cooking completed by the third, and it was served with that universal British sauce—melted butter. All the party partook of it, and without any ill effects, and it was pronounced excellent. Some German friends of the artist, however, having heard of this culinary success, obtained from the wood some similar specimens, but in consequence of omitting the preliminary two boilings they were very ill. This illustrates the results produced by different treatments of the same vegetable, and the care that may be required in fitting some of these esculents for the digestive organs. I have no scientific knowledge of mushrooms, but have been a great gatherer of them in different parts of Britain, and well know that there are several sorts, even of those universally recognised as mushrooms. The best are those found on downs and open hilly country. There is a brown sort, which is perfectly wholesome, but not so fully flavoured as the others. The horse-mushroom requires more cooking than the other sorts, as its texture is more firm and leathery. In the country there are often fanciful tests as to whether such as have been gathered are true mushrooms; such as whether the top skin will peel off readily; and also whether they are pink beneath. These seem to me fallacious; the best test appears to me to bite off and

taste a small piece, which, even if of unwholesome sorts, will do no harm, when the flavour at once tells whether the mushrooms in question be of the right kind. I have often eaten the fairy-rings with the light-brown laminae beneath, and they are very delicate, though not so full-flavoured as the usual mushrooms; but in most parts of the country I have found a great prejudice against them. When staying in Somersetshire some years ago, I brought home a small basketful, and had great difficulty in inducing the landlady of the little inn where we were staying to let them be cooked for supper; and from her expression of countenance the next morning I believe she felt some disappointment in seeing us perfectly well, after eating what she called “pixie-stools,” a provincial variation of the name fairy rings. But rustic people are wonderfully prejudiced sometimes, and are characteristically not at all obliged to you for dissipating their unfounded notions. I recollect a country boy bringing me with great care in a basket a lizard, and he was horrified when I took it out with my hand, exclaiming it was poisonous. Thus also does the poor blind or brittle worm constantly meet with an unmerited fate from being kindred in shape to the viper, although a more harmless creature does not exist. I think we are very much obliged to the Rev. Mr. Berkeley for the useful and interesting information he recently gave to the food committee, on the subject of esculent fungi; and the circulation of this in the *Journal* will be of service, as I believe many people are prepared to look on fungi with a more favourable eye, if they had clear and precise information with regard to them. Unfortunately, I believe that one of the most unwholesome kinds is very much like the common esculent mushroom; indeed, to a cursory view exactly like them as you see them growing, only that on gathering them you find they are white beneath. But, then, there is an easy test of these. If you bite a piece off it is pungent in the mouth, which pungency is I believe in a general way a good test of unwholesomeness. By pungency, I do not mean a pungency like cress, but a pungency like pepper, only more burning, lasting on the tongue for some time. In the New Forest, in Hampshire, two or three years ago, I heard of a gentleman who was a rigid vegetarian, and whose “meat” was solely the fungi of the forest, of which I was told he used almost every sort, varying their preparation. I did not see this thinker for himself, but I have met by the woods, near Cliefden, on the Thames, a well-known medical gentleman of London with a whole basketful of various fungi he had just gathered, on which he promised himself an epicurean repast.—I am, &c., JOHN BELL.

MEETINGS FOR THE ENSUING WEEK.

- MON.....Entomological, 7.
Victoria Inst., 8.
R. United Service Inst., 8½. Mr. J. R. Hamilton, “The American Navy: its Organisation, Ships, Armament, and recent Experiences.”
- TUES ...Anthropological, 8.
Syr-Egyptian, 7½. Rev. G. Williams, “Explorations in Palestine.”
- WED ...Society of Arts, 8½. Conversazione at South Kensington Museum.
Geological, 8. 1. Mr. James Thompson, “On some Carboniferous Corals” (communicated by Dr. P. Martin Duncan. 2. Mr. S. V. Wood, jun., “On the Pebble-beds of Middlesex, Essex, and Herts.” 3. Mr. W. Topley, “On the Cretaceous Rocks of the Bas Boulonnais.” 4. Mr. C. H. Weston, “Note on the Mendip Anticlinal.”
- Obstetrical, 8.
- THUR ...Royal, 8½.
Lingnan, 8. 1. Prof. Rolleston, “On the Homologies of the Muscles connected with the Shoulder-joint.” 2. Prof. Williamson, “Contributions to the History of *Zamites Gigas*.”
Chemical, 8. 1. Messrs. E. T. Chapman and Smith, “On Isomerism in the Organic Cyanides,” and “On the Artificial Formation of Pyridine.” 2. Dr. B. H. Paul, “On Testing Mineral Oils used for Lamps.”
- R. Society Club, 6.
Society of Fine Arts, 8. Mr. F. Y. Hurlstone, “A Criticism upon Art Criticism in England.”

FRI.....Geologists' Assoc., 8.
Philological, 8.
Royal Institution, 8.
Archæological Inst., 4.
R. United Service Inst., 3. Col. A. H. Lane Fox, "Primitive Warfare: Section 2—On the Resemblance of the Weapons of Early Races; their Variations, Continuity, and Development of Form."

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par.
Numb.
115. Bill—City of London Gas (as amended in Committee, and by the Select Committee).
117. „ Established Church (Ireland).
266. Contagious Diseases Act (1866)—Memorial.
Public Petitions—Twentieth Report.

Delivered on 18th May, 1868.

89. Bill—Married Women's Property.
241. Voters (Oxford and Cambridge, &c., Universities)—Return.
258. Taxes (Courts of Appeal)—Return.
272. Electric Telegraphs Bill—Further Correspondence.
North German Confederation and Spain—Despatch.

Patents.

From Commissioners of Patents' Journal, May 22.

GRANTS OF PROVISIONAL PROTECTION.

Advertising vehicles—339—H. A. Bonneville.
Alarums—1192—J. Fitter.
Aniline, new colouring matter from—1424—C. D. Abel.
Apparatus for separating mixed, &c., substances—1427—A. B. Childs.
Armour or armour-plating material—1373—D. Geraci.
Axle-boxes—1463—C. D. Abel.
Baths, &c.—1502—R. Harlow.
Bearings, shafts, or pivots—1498—R. A. Green.
Bells—1454—T. and G. A. Pemberton.
Bird-cages—1394—S. Robotham.
Boilers, &c.—1421—T. Beeley.
Boilers used for dressing flour, &c.—1508—J. Bruce and R. Evans.
Bolts, screw—1450—A. Vickers.
Boots and shoes—1259—W. E. Gedge.
Boots and shoes, button-hook for—1312—T. D. Scowen.
Bottles, retaining stoppers in—1448—H. Glover.
Boxes, wooden—1425—E. Leheup.
Buildings—1319—H. D. Chard.
Candlesticks, &c.—1276—T. A. Warrington.
Castors—1518—J. C. Bowler.
Canisters, &c., soldering—1418—B. F. Weatherdon.
Carpets, printing—1476—J. Wilkinson, jun.
Carriages—1455—E. and G. H. Morgan.
Chimney-tops—1452—C. P. Aston.
Clothes, attaching to the person—1477—A. Scott.
Coal, &c., getting—1482—C. J. Chubb.
Combs—1488—W. E. Newton.
Copper tubes, &c.—1429—W. E. Everitt.
Copper tubes, &c., casting—1520—W. E. Everitt.
Creosote, &c., apparatus to be used in connection with furnaces for burning—1441—A. Smith.
Dynamometers—1447—W. R. Lake.
Engines, motive-power—1461—F. W. Gerhardt.
Engines, steam—1465—J. Dawber.
Engraving, heliographic, plates for—1499—A. C. Henderson.
Fabrics, textile—1431—J. H. Johnson.
Fabrics, woven—1411—J. Dandy and J. R. Beard.
Fabrics, woven, finishing—1378—R. Holt, R. Burdison, & H. Sampson.
Filles, renovating—1500—A. C. Henderson.
Fire-arms, breech-loading—1261—J. Erskine.
Furnaces—1432—J. Heaton.
Furnaces, glass, &c.—1480—T. Warren.
Furnaces, increasing draught in—1494—J. H. Johnson.
Gas, &c.—1098—H. H. Doty and G. Graveley.
Gold, &c., compositions for cleaning—1484—H. J. Davies.
Grain, &c., separating impurities from—1491—J. G. Walker and C. Steln.
Ice preservers, &c.—1469—G. Kent.
Iron and steel—1397—W. Wright.
Iron and steel—1516—J. A. Jones.
Kilns for burning lime, &c.—1439—H. Y. D. Scott.
Lace, &c., clipping—1456—W. Marshall.
Ladders—1471—W. Beale.
Lamps and lanterns—1493—W. Harvie.
Lead, white—1341—J. Baggs.
Liquids, measuring, &c.—1423—J. Lillie.
Lockets—1453—J. Wertheim and L. Hirschhorn.
Looms—157—J. Batchelor and J. Smith.
Looms—1438—L. Binns.
Looms—1474—J. Lamb and S. Tovey.
Looms—1495—M. A. Muir and J. McIlwham.
Machinery, portable, for screw-cutting, &c.—1252—H. G. Fairburn.
Mallets used in croquet, &c.—1437—E. G. Camp.
Matches and fuses—1483—J. and J. B. Palmer.

Mattresses and seats, spring—1496—H. A. Bonneville.
Metal sheets, corrugating—1290—J. Woolfield.
Metallic articles, preserving from oxidation and decay—1467—J. Hickmott.
Millstones, dressing—1492—J. G. Walker.
Needles, machinery for polishing—1514—A. James.
Omnibuses, &c., prevention of fraud in the collection of fares in—1486—S. Drummond, J. Clare, and R. Hughes.
Paits, unspillable—1433—F. Barnett.
Paper-cutting machines—1409—J. Gough.
Petroleum, &c., warehousing—1451—I. Mathei.
Pickaxes, &c., machinery for forming—1475—W. E. Newton.
Pictures, photographic, exhibiting minute—1443—J. H. Johnson.
Pipes and tubes, fastening for—1428—J. Warne.
Potatoes, preparing for preservation—1473—F. J. King.
Rafts, &c.—1234—B. and A. B. Blackburn.
Railway tickets, &c., carrying—1417—J. W. Goundry.
Railways—995—E. Gray.
Railways—1312—J. Armstrong.
Railways, preventing accidents on—1490—S. Holt and J. Kearsley.
Rock-boring machines—1512—W. Husband and F. B. Döring.
Safes—1415—S. Chatwood.
Sails, reefing—1387—A. Baal and C. Gann.
Seed and manure drill—1436—T. Hawkes, F. W. and G. Spencer, and J. Stenner.
Seeds, &c., expressing oils from—1472—W. Walker and H. F. Smith.
Sewing machines—1504—J. H. Johnson.
Shipbuilding, &c.—1412—J. Betteley.
Ships, iron and steel—1460—W. Taylor.
Silver, coating with—1449—W. E. Gedge.
Soup, method of preventing the moustache from dipping into, when eating it from a spoon—1398—A. Geary.
Spindles—1322—D. Skeoch.
Steel, cast—1462—C. W. Siemens.
Steel, iron, &c.—1489—M. Henry.
Taps—1459—D. P. Wright.
Throistle frames—1506—W. E. Gedge.
Tobacco, twisting—1413—R. Ward.
Tools for planing, &c.—1419—M. A. F. Mennons.
Traps for receiving sewage matters, &c.—1468—J. Court.
Umbrellas and parasols—1442—J. E. Boyce and R. Harrington.
Umbrellas and parasols—1479—R. Lublinski.
Vegetable and bituminous products, preparing, &c.—1336—J. Rogers.
Vegetable medicinal compound for scalds, &c.—1340—M. Z. D'Aschau.
Wood-cutting machines, &c.—1461—W. Sketchley.
Wool, &c., drying—1445—J. L. Budden.
Wool, &c., screw-gill boxes for preparing—1466—J. Clough.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Churns—1619—M. A. Hamilton.
Engines, steam—1559—J. W. Chamberlain.

PATENTS SEALED.

3325. M. A. Hamilton.	3521. G. H. Nick.
3326. T. Barton.	3689. W. E. Newton.
3327. F. Brown.	3690. W. E. Newton.
3328. G. Turner.	296. W. R. Lake.
3333. T. Chalmers.	307. W. Snell.
3337. W. Sim.	308. W. Snell.
3339. J. P. Smith.	337. J. H. Johnson.
3340. J. P. Smith.	389. S. G. Taylor.
3325. G. Breen.	599. W. R. Lake.
3443. N. Grew.	677. C. E. Brooman.
3482. P. R. Hodge.	755. J. J. F. Stevens.
3495. E. Keirby.	1110. W. R. Lake.

From Commissioners of Patents' Journal, May 26.

PATENTS SEALED.

3356. W. Fowler and J. Griffiths.	3399. W. E. Gedge.
3360. H. F. Gardner.	3409. R. Clay, jun.
3370. E. T. Hughes.	3415. E. Price.
3371. T. & B. Carter & J. Lisle.	3439. W. Brown and C. N. May.
3372. W. Cotton.	3440. J. Giers.
3374. E. T. Hughes.	3491. C. M. Barker.
3382. J. Scholefield.	3498. W. Clark.
3387. J. Fraser and G. Duncan.	3507. W. Palliser.
3388. T. Rose and R. E. Gibson.	3615. J. Kerr.
3391. H. S. Cowan.	3719. J. H. Johnson.
3394. A. Turner & W. E. Newton.	1037. W. Manwaring.
3397. J. J. Parkes.	1075. B. Mitford.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

1393. J. A. Coffey.	1501. F. and J. G. Richmond and H. Chandler.
1398. J. Armstrong.	1731. W. E. Newton.
1452. C. Frazer.	1423. G. Ashcroft.
1941. A. V. Newton.	1466. R. A. Brooman.
1425. J. Ramsbottom.	1480. J. Hibell.
1440. H. E. Newton.	1656. W. Clark.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

1286. G. E. Donisthorpe.	1339. G. Asher.
1302. G. E. Donisthorpe.	1306. C. Nuttall.
1379. R. C. Ransome.	